PAPER ID : 3033

TEC-201 Printed Pages : 7

ID and Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | |

B. Tech.

(SEM. II) EXAMINATION, 2010

FUNDAMENTALS OF ELECTRONIC ENGG.

Time : 3 Hours] [Total Marks : 100

Note : Attempt all questions. All questions carry equal marks.

1 Attempt any **four** parts : 5×4

(a) Using the concept of energy band diagram, explain why some materials behave As Conductor, insulator. Show the appropriate location of Fermi energy level in The Energy band diagram of intrinsic semiconductor, N-type and p-type Semi Conductors.

(b) In a doped semiconductor there are 4.52×10^{24} holes and 1.25×10^{14} Electrons per cubic meter . What will be carrier density in undoped specimen? Electrons and holes mobilities are 0.38 m^2/v.s and 0.18 m^2/v.s respectively. Calculate conductivity of intrinsic and doped semiconductors?

(c) Draw and explain V-I characteristics of p-n junction diode. Explain how Depletion layer Develops in the diode.

Contd...

(d) Derive the expression of Fermi level for P type semiconductor.

(e) Find Conductivity and resistance of a bar of pure silicon of length 1 cm and cross Sectional area 1 mm^2 at 300 K.Given.

$n_i = 1.5\times10^{16} / m^3$, $\mu_n = 0.13\ m^3/v.s$

$\mu_p = 0.05\ m^3/v.s$, $q = 1.6 \times 10^{-19}$ C.

(f) What is Hall Effect? What are the applications of the Hall Effect? Derive an expression for the hall voltage and hall resistance.

2 Attempt any **four** parts : 5×4

(a) An a.c. supply of 200 v is applied to a half- wave rectifier circuit Through a Transformer of turn ratio 4: 1.The load resistance is 300 Ω. Assuming diode Is ideal one, Determine following?

(1) D.C. output voltage

(2) PIV

(3) Maximum value of power delivered to the load

(4) Average value of power delivered to the load

(b) Write a short note on the application of a zener diode as a Shunt regulator.

4 Attempt any **two** parts : 2×10

(a) Explain the Construction and working of the Enhancement type MOSFET Also explain the drain and transfer characteristics of this MOSFET?

(b) For the circuit diagram given below if $I_{DSS} = 8$ mA and $V_P = -6$ V then Determine I_D, V_{GS}, V_{DS}, V_D, V_G, V_S.

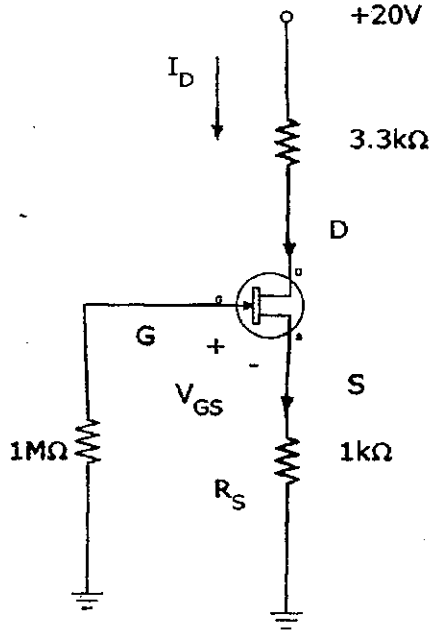

Fig. 3

(ii) For a common base amplifier, a transistor has the following value of the h-parameter :

$h_{ib} = 28$ ohms $h_{fb} = -0.98$ $R_L = 1.2$ K ohm

$h_{rb} = 5 \times 10^{-4}$ $h_{ob} = 0.34 \times 10^{-6}$ mhos

Find the values of current gain, input resistance, output resistance Voltage gain.

(b) (i) Explain why should Q point be located at the centre of the load line of the Active region of output characteristics of transistor. Derive the expression For the stability factor?

(ii) Draw hybrid equivalent circuit for CE and CB Transistor?

(c) For the circuit diagram given below determine I_B, I_c and V_{CE} Given $\beta = 50$ and transistor is of Si type.

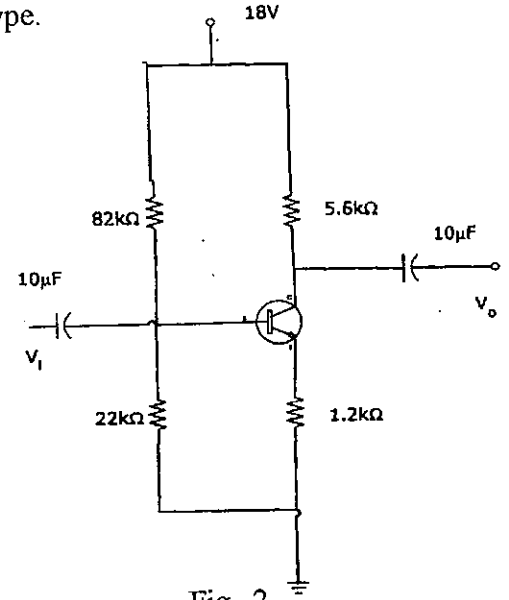

Fig. 2

(c) Calculate the Ripple factor for an output voltage of 9 v peak has a Peak to peak ripple voltage of 5 v.This is obtained for a load of $R_L = 100$ ohms And $C = 50$ microfarads.

(d) Explain the following terms:

(i) Static Resistance and Dynamic Diode Resistance

(ii) Diffusion capacitance and transition capacitance.

(e) Explain Positive and Negative clamper with input and output waveforms?

(f) Determine the range of values of Vi that will maintain the Zener diode In the ON state.

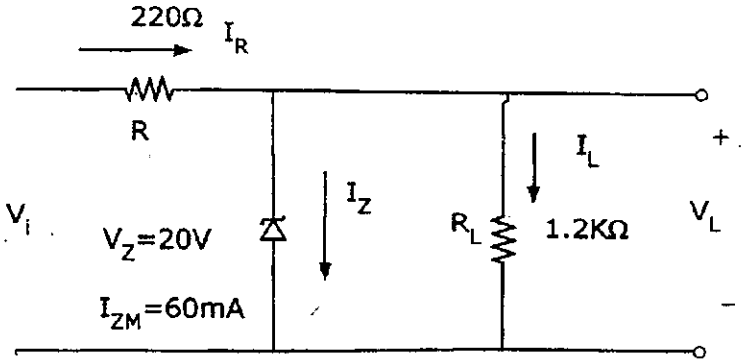

Fig. 1

3 Attempt any **two** parts : **10×2**

(a) (i) Draw neatly the input and output characteristics of a CE and CB transistor Show active, saturation and cut off region in the characteristics.